

**Second Five-Year Review Report**

**for the**

**Wheeling Disposal Service Company, Incorporated, Landfill Site**

**Amazonia, Missouri**


**September 2004**

**Prepared by:**

**Region VII  
United States Environmental Protection Agency  
Kansas City, Kansas**

Approved by:

Date:

  
Cecilia Tapia  
Director  
Superfund Division

9/20/04

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SUPERFUND RECORDS

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## List of Acronyms

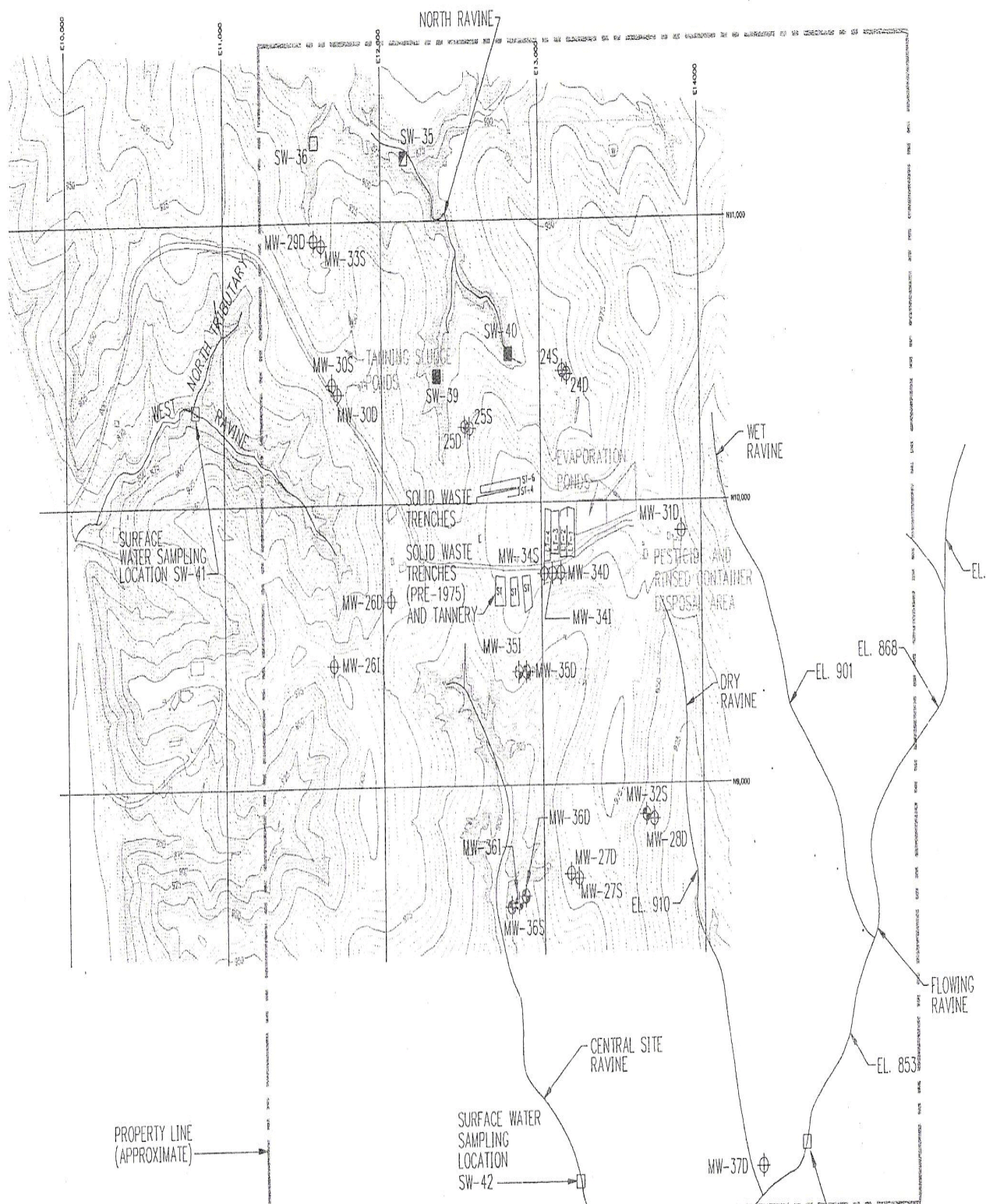
ARARs	Applicable or Relevant and Appropriate Requirements
BAT/BMP	Best Available Technology/Best Management Practices
CERCLA	Comprehensive Environmental Response, Conservation, and Liability Act
CFR	Code of Federal Regulations
CSR	Code of State Regulations
HASP	Health and Safety Plan
MCL	Maximum Contaminant Level
MDNR	Missouri Department of Natural Resources
MG/KG	Milligrams per kilogram
MG/L	Milligrams per liter
MSL	Mean Sea Level
NCP	National Oil and Hazardous Substances Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
PPB	Parts per billion
PPM	Parts per million
PRP	Potentially Responsible Party
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SAL	State Action Level
UG/KG	Micrograms per kilogram
UG/L	Micrograms per liter
UST	Underground Storage Tank
VOC	Volatile Organic Compound



## **Executive Summary**

The second five-year review of the Wheeling Disposal Service Company, Incorporated, Landfill (Wheeling) site has been completed. An inspection of the site was conducted by the Environmental Protection Agency (EPA), the Missouri Department of Natural Resources (MDNR) and the PRP (potentially responsible parties') contractor on June 25, 2003. Groundwater and surface water data were collected by the PRP contractor and received in October, 2003. An inspection of the site for the second half of the ninth year was conducted by the PRP contractor in November, 2003. The results of the five-year review indicate that the remedy is protective of human health and the environment. The remedy which was agreed to by the EPA and the MDNR in a Record of Decision (ROD) on September 27, 1990, included well plugging, surface water and groundwater monitoring, and upgrading the existing landfill cover to comply with state and federal standards. The Wheeling site in Amazonia, Missouri is a 20-acre site, centrally located on two adjacent areas totaling about 200 acres in Andrew County. The landfill was established in the early 1970's, and the facility received a state permit in 1975 to operate as an industrial waste disposal facility. Between 1980 and 1981, the company voluntarily ceased operations. The facility resumed operations under the authority of a special waste disposal permit issued by the state of Missouri until it voluntarily closed in 1986. The MDNR periodically inspected the site and monitored groundwater when the landfill was in operation. Based on MDNR hazardous waste records, wastes containing pesticides, heavy metals, paint, solvents, and leather tanning sludge were disposed of in the landfill. In field investigations, conducted by the EPA, contaminants were detected in monitoring wells and springs on the site. The groundwater and soil on site were contaminated with various volatile organic compounds (VOCs) and heavy metals including arsenic, chromium, nickel, and lead from the former waste disposal activities. In 1989 the site was placed on the final National Priorities List (NPL). In 1990 the PRPs completed site studies. A Consent Decree was signed in 1991 requiring the PRPs to conduct the remedy design and clean-up activities. The court approved the Consent Decree in 1992. The construction for the remedy was completed in 1994. Long-term maintenance and groundwater and surface water monitoring are being conducted by the PRPs to ensure long-term protectiveness.

Figure 1. Location Map





# Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Wheeling Disposal Service Company, Incorporated, Landfill Site		
EPA ID (from WasteLAN): MOD000830554		
Region: VII	State: MO	City/County: Amazonia/Andrew
SITE STATUS		
NPL status: <input type="checkbox"/> Final <input checked="" type="checkbox"/> Deleted <input type="checkbox"/> Other (specify) _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: _09 / 28_ / 1994__	
Has site been put into reuse? <input type="checkbox"/> X YES <input type="checkbox"/> NO		
REVIEW STATUS		
Reviewing agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Catherine Barrett		
Author title: Remedial Project Manager	Author affiliation: EPA Region VII	
Review period: _06 / 03__ to _09 / 04__		
Date(s) of site inspection: _06 / 25_ / 03__		
Type of review: <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Policy ( <input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion)		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <input type="checkbox"/> RA Onsite Construction <input type="checkbox"/> RA Start <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify) _____		
Triggering action date (from WasteLAN): 09_ / 29_ / 1999__		
Due date (five years after triggering action date): 09_ / 29_ / 2004__		

## **Five-Year Review Summary**

**Deficiencies:** None

**Recommendations and Follow-up Actions:**

The Wheeling site should continue to be maintained by the PRPs in accordance with the Consent Decree.

**Protectiveness Statement:**

All immediate threats at the site have been addressed, and the remedy for the site is protective of human health and the environment.

**Long-term Protectiveness:**

Long-term protectiveness of the remedial action has been verified by the annual monitoring of surface water and groundwater and the semi-annual inspections of the site.

# Wheeling Disposal Company, Incorporated, Landfill Site Five-Year Review Report

## I. Introduction

The Environmental Protection Agency (EPA), in cooperation with the Missouri Department of Natural Resources (MDNR), has conducted a five-year review of the Superfund remedial action implemented at the Wheeling Disposal Company, Incorporated, Landfill (Wheeling) site near the city of Amazonia, in Andrew County, Missouri.

The five-year review report is completed pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA); to Section 300.430 (f) (4) (ii) of the National Oil and Hazardous Substances Contingency Plan (NCP); and pursuant to EPA/Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7 - 03B-P, Comprehensive Five-Year Review Guidance (June, 2001).

The purpose of the five-year review is to ensure that the remedy at the site remains protective of human health and the environment. The five-year review report identifies any deficiencies found and provides recommendations.

This five-year review is required by statute and is implemented consistent with the CERCLA and the NCP. CERCLA Section 121 (c), as amended, states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.*

The NCP Part 300.430 (f) (4) (ii) of the Code of Federal Regulations (CFR) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.*

This is the second five-year review for the Wheeling site. The triggering action for this review is the first five-year review.

## II. Site Chronology

Table 1 lists the chronology of events for the Wheeling site.

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Table 1            Chronology of Site Events

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Date	Event
1980	Preliminary Assessment/Site Inspection
1987	PRP Search
01/22/1987	Proposal to the NPL
1987, 1988	Information Request Letters Issued Notice Letters Issued
10/04/1989	Final Listing on the NPL
1990, 1991, 1993	Removal Assessment
1988, 1991	Negotiation
1990	PRP Remedial Investigation/Feasibility Study
09/27/1990	Record of Decision
1992	Consent Decree
1993	PRP Remedial Design
1994	PRP Remedial Action complete
1994	Preliminary Close-Out Report
09/29/1999	First Five-Year Review Report
10/30/2000	Deletion from the NPL

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### **III. Background**

#### **Physical Characteristics**



The Wheeling site is located in a rural area near the city of Amazonia, approximately six miles north of St. Joseph and six miles southwest of Savannah, in Andrew County, Missouri. The property is owned by Wheeling Disposal Service Company, Incorporated, St. Joseph, Missouri, and consists of a 20-acre site, centrally located on two contiguous parcels of land covering approximately 200 acres. The site is situated in bluffs approximately one-fourth to one-half mile east of the Missouri River flood plain.

The Amazonia, Missouri area is underlain by, in descending order, unconsolidated deposits of the Holocene and Pleistocene Series, Quaternary System, and consolidated bedrock deposits of the Douglas Group, Virgillian Series, Pennsylvania System.

The surficial units consist of Holocene alluvium within the Missouri River valley and Pleistocene loess and glacial drift in the uplands to the east of the Missouri River valley. The glacial drift consists predominantly of inter bedded cohesive clay layers, and granular sand and gravel layers. The glacial drift is thickest over an east-west buried bedrock valley that underlies the site.

The geology of the Wheeling site is characterized by three stratigraphic units in descending order, loess, glacial drift, and bedrock. The loess is of Wisconsin-Illinoian age and consists of 4 to 35 feet of clayey silt and silt which contains minor amounts of sand. The loess is thickest on the central ridge where the wastes were disposed, and thinnest near the ravines located around the periphery of the disposal areas. The hydraulic conductivity of the loess ranges from  $1 \times 10^{-6}$  to  $2.6 \times 10^{-5}$  centimeters per second (cm/s).

The loess is unconformably underlain by Pre-Illinoian aged glacial drift. The glacial drift ranges from 48 to 155 feet thick and is comprised of inter bedded granular and cohesive deposits. The drift is thickest within the deepest portion of the bedrock valley located beneath the southern portion of the site. The thickness of individual cohesive layers ranges from 2 to 10 feet. The thickness of individual granular layers ranges from less than one foot to 22 feet. These sand and gravel layers are thickest within the deepest portion of the buried bedrock valley. The hydraulic conductivity of the cohesive layers ranges from  $6.7 \times 10^{-9}$  cm/s to  $6.1 \times 10^{-8}$  cm/s. The hydraulic conductivity of the granular layers ranged from  $1.38 \times 10^{-5}$  cm/s to  $5.45 \times 10^{-2}$  cm/s.

The glacial drift is unconformably underlain by Pennsylvanian aged bedrock. Shale belonging to the Lawrence Formation outcrops in the unnamed tributary located along the northern boundary of the site. The bedrock surface at this location is at approximately 880 feet above the mean sea level (msl) elevation which corresponds to the northern edge of the buried bedrock valley. Shale and limestone bedrock is also encountered in borings. The lowest elevation for which the bedrock was encountered in borings was 789 feet msl.

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The regional hydrogeologic classification of the deposits underlying the Amazonia, Missouri area is categorized into the Holocene alluvium aquifer, the Pleistocene glacial drift water bearing unit, and the Pennsylvanian bedrock aquitard.

The Holocene alluvium that occurs within the Missouri River valley has been

characterized as suitable for development as both a potable and irrigation water supply source. The city of Amazonia formerly used two wells screened in the alluvium for a potable water source. The city of Savannah, Missouri currently uses a well screened in the alluvium as a potable water source. This well is located approximately one mile northwest of the site.

At some locations the Pleistocene glacial drift is sufficiently transmissive to be characterized as suitable for development as a potable water source. Groundwater yields from this water-bearing unit can be expected to range from 5 to 50 gallons per minute. The higher yields are associated with the thick sand and gravel deposits that occur within the buried bedrock channel. There are records of six private water supply wells screened in the glacial drift within one mile of the site. Only one well is currently known to be used as a potable water source. In 1990, the Missouri Division of Geology and Land Survey (MDGLS) classified the geologic system beneath the Wheeling Disposal site to be a useable aquifer.

The Pennsylvanian age bedrock generally acts as an aquitard due to the low transmissivity of these deposits and is not a suitable source of potable water due to high salinity and hardness of the groundwater. The thick shale sequences within the Pennsylvanian bedrock retards vertical groundwater migration.

During the RI, 23 wells on the Wheeling site were monitored for groundwater elevation. These wells were installed in paired nests with one well monitoring the top of the water table and the paired well monitoring deeper groundwater. These wells are screened in the glacial drift and range from 33 to 174 feet deep.

One unconfined groundwater system is present within the shallow glacial drift. A prominent downward vertical gradient averaging 0.7 feet/foot was measured in the shallow and deep monitoring well nests. This indicates that the site is a source of groundwater recharge for the glacial drift.

Rainfall which percolates through the upper loess material encounters the less permeable clays of the upper glacial drift. The less permeable clays act as an aquitard. As a result, the shallow groundwater flows north on the north side of the site and south on the south side of the site. On the north side, the shallow groundwater surfaces in the north ravines in the form of very low flowing seeps ( $\frac{1}{2}$  gallon per minute). On the south side, all of the shallow groundwater eventually migrates deeper into the glacial drift.

The groundwater potentiometric surface within the upper glacial drift was measured in August 1989. The groundwater flow direction within the upper glacial drift is roughly

perpendicular to the site topographic contours with an average horizontal gradient of 0.06 feet/foot to the north and 0.045 feet/foot to the south.

## **Land and Resource Use**

Several private residences are located within a one-mile radius of the site. Two residences located approximately one-fourth mile west of the site and the city of Amazonia receive their drinking water from a water supply district originating in St. Joseph. The city of Savannah uses a well in the Missouri River alluvium located approximately one mile northwest of the site for supplying part of Savannah's public drinking water supply.

### **History of Contamination**

Wheeling Disposal Service Company operated a sanitary and industrial landfill on the site from a period in the early 1970s until it closed in 1986. The facility received a state permit in 1975 to operate as an industrial waste disposal facility. The MDNR issued a permit limiting industrial waste disposal to a ten-acre area in the central portion of the site. Between 1980 and 1981, the company voluntarily ceased operations. The facility resumed operations under the authority of a special waste disposal permit issued by the state of Missouri until it voluntarily closed in 1986. The MDNR periodically inspected the site and monitored groundwater when the landfill was in operation. Based on MDNR hazardous waste records, wastes containing pesticides, heavy metals, paint, solvents, and leather tanning sludge were disposed of in the landfill.

The wastes were disposed in nine solid waste trenches, five liquid waste trenches, two evaporation ponds, a farm chemicals area, three tannery waste disposal areas, and a rinsed container area. Certain disposal units received only one type of waste, such as tannery sludge, while other areas received a combination of wastes.

### **Initial Response**

In December 1980, a preliminary assessment and site inspection were performed by Ecology and Environment, Incorporated (E&E) for the EPA. The report concluded that there was no significant evidence of leaching or off-site migration of contaminants, but noted the potential for lateral seepage beneath the site. The site was given a medium to high priority for further monitoring, based on the active status of the landfill and because of the types of wastes which had been disposed at the site.

The EPA sampled on-site groundwater monitoring wells and springs in November 1982. Analyses of these samples revealed barium, manganese, and arsenic existing at concentrations above safe drinking water standards, and trace amounts of at least five organic compounds. The

report concluded that there was no evidence of off-site migration of contaminants, but recommended further monitoring and inspections.

The EPA conducted a follow-up inspection of the site and sampled on-site monitoring wells and springs and three off-site private wells in November 1983. Concentrations of metals above safe drinking water standards and 12 organic priority pollutants were detected in on-site wells and springs. Priority pollutants included 1,1 dichloroethane, trichloroethylene (TCE), 2-

butanone, benzoic acid, chloroform, bis (2-ethylhexyl) phthalate, bromodichloromethane, and chlorodibromomethane. Trace amounts of organic compounds and concentrations of iron and manganese above the safe drinking water standards were detected in the samples from off-site private wells and springs. However, there was no conclusive evidence of off-site migration. The report recommended further periodic monitoring and inspections.

Roy F. Weston, Inc. prepared an Endangerment Assessment for the EPA for the site in January 1985. The report reviewed results and data from previous investigations and concluded that while organic contamination existed in onsite wells and springs, there was no evidence of offsite migration. As in the earlier studies, continued monitoring was recommended because of the potential for offsite transport of groundwater contaminants.

The Missouri Department of Health (MDOH) performed sampling of offsite private wells and creeks in the site vicinity in January 1986. Results of the sampling indicated the presence of aluminum, barium, iron, and manganese in the stream samples and the presence of aluminum in samples from two private wells. Levels of contaminants were not considered to pose a significant health threat.

In response to complaints from local residents concerning the possibility of contamination of drinking water supplies, the EPA and MDOH sampled wells and springs in the site vicinity in early 1987. Results confirmed earlier sampling events indicating that onsite groundwater is contaminated but is not migrating offsite.

In field investigations conducted by the EPA, contaminants were detected in monitoring wells and springs on the site. The groundwater and soil on site were contaminated with various volatile organic compounds (VOCs) and heavy metals including arsenic, chromium, nickel, and lead from the former waste disposal activities. Several seeps on the north side of the site were contaminated, indicating that local surface water was potentially threatened.

Closure activities undertaken by Wheeling Disposal Service Company included filling, grading, recontouring, and capping of the former waste disposal area. An inspection by MDNR in 1986 indicated that the landfill had not received any wastes for some time. A site visit by EPA in May 1987 confirmed that the site had been covered with soil, graded, and no longer received wastes for disposal.

The EPA notified the owner and 39 generators of their potential liability in a series of

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general notice and information request letters during 1987 and 1988. Special notice letters were sent in 1988 to PRPs requesting them to make a good faith offer to perform the Remedial Investigation (RI) and Feasibility Study (FS). On August 24, 1989, five generators and the owner entered into an Administrative Order on Consent to perform the RI and FS. The site was placed on the NPL in October 1989.

The RI field work was conducted in two phases by the PRPs under EPA oversight from February 1989 to February 1990. The objectives were to define the types of contaminants at the

site, potential routes of contaminant migration and routes of exposure, population and environmental areas that could be affected, and site-specific factors that may affect the remedial actions at the site. The field work included:

- (1) a geologic and hydro geologic investigation that included the drilling of 9 deep borings and 6 shallow borings, the sampling of soil from the 9 deep borings, installation of 15 monitoring wells in the boreholes, and sampling of the groundwater from the 15 new monitoring wells and 9 preexisting wells;
- (2) surface soil sampling primarily in areas of known previous landfill activities as well as a background surface soil sample;
- (3) discrete subsurface soil sampling in areas of known previous landfill activities, as well as a background discrete subsurface soil sample;
- (4) sediment sampling from locations within the northern and southern ravines on the property and the onsite dry pond;
- (5) sampling from the seeps located in the northern ravines of the site as well as a background surface water sample;
- (6) characterization of the existing cover located over the previous disposal units by observation and physical analysis of the soil;
- (7) private well survey to the east of the site in an effort to determine the number of wells in use, distance of the wells from the site, the wells hydro geological relation to the site, and physical characteristics of the wells; and,
- (8) surface water sampling along the property boundary in the ravine located in the northern portion of the site.

Several types of contamination - VOCs, organic compounds (including pesticides), and metals - were found during the RI in varying concentrations and in various media including groundwater, surface water, sediment, surface soils and subsurface soils. The elevated concentrations of VOCs in the groundwater and surface water indicate a release of chemicals from the original disposal areas. The elevated concentrations of metals and pesticides in the surface soils indicate either degradation of the cover or improper construction of the cover.

#### Subsurface soil

Analytical results indicated the presence of VOCs, highly mobile contaminants, in areas

of previous landfilling activities. Concentrations of methylene chloride at 180 parts per billion (ppb) , and TCE at 20 ppb were detected in boring 23D at the 12 to 13 foot sampling interval. Boring 23D is located immediately east of the liquid waste disposal trenches in the central portion of the site. Neither of these contaminants were encountered at greater depths in this boring.

Mercury and magnesium, inorganic contaminants which are relatively immobile under conditions at this site, were detected above background levels in borings 24D and 27D at 5.03

parts per million (ppm) and 9570 ppm. Cyanide was detected in the bedrock boring 26D at the level of 1.77 ppm. Mercury and cyanide were not detected above background levels (0.19 ppm and 1.0 ppm) at greater depths in the same borings. Magnesium levels were only slightly elevated in relation to other background magnesium levels (5190 ppm) detected on the site.

Discrete subsurface soil samples were taken from the 0 to 18 inch and 18 to 36 inch intervals below the surface in the pre-1975 and post-1975 tannery waste disposal areas. Chromium is the primary contaminant of concern for tannery wastes and was detected above onsite background levels (22.8 ppm) at both locations. Chromium was found at levels up to 594 ppm and 89.1 ppm in the pre-1975 and post-1975 locations.

#### Surface Soils and Sediment

Results of samples analyzed during the RI for pesticides revealed the presence of pesticides at low levels, except for one sample where aldrin was found at 8600 ppm. The high aldrin level in the south ravine was 226 ppm. The typical level was below 20 ppm.

The cluster of various types of pesticides at the former farm chemicals disposal area and downgradient of that area, indicates that the source of those contaminants may have been due to an ineffective closure such as using contaminated onsite soil for the cover material. The presence of chromium in the cover material over the disposal trenches at a concentration 100 times above background levels is consistent with the conclusion that contaminated onsite soil was used for cover material.

#### Groundwater

The RI report presented the contaminants which were identified in onsite groundwater at levels above background levels. VOCs and pesticides do not occur naturally in nature so any detectable level of these contaminants is considered above background.

VOC contamination was found to have extended to the shallow groundwater under the site, primarily on the north side of the site. The results indicated that the VOC contamination had not migrated offsite or into the deep groundwater under the site. Carbon tetrachloride and chloroform were detected in one deep well (31D) in one sampling event. Well 3, located south of the industrial disposal units, was the only well contaminated with VOCs on the south side.

The first phase of samples analyzed for metals indicated high concentrations in most wells with very high levels of suspended solids. Monitoring wells 14, 29S and 30S indicated contamination with several metals and high suspended solids concentrations. The metal contaminants detected in wells 27D, 28S and 28D are aesthetic water quality concerns and may be related to the natural geology.

Toluene and sevin were found in private wells. The source of these contaminants were thought to be associated with onsite farming activities and not the site.

## Surface Water

The RI report presented the contaminants which were identified at levels above background in surface water.

### **Basis For Taking Action**

As part of the RI, a risk assessment was completed in order to characterize the current and potential threats to human health and the environment that may be posed by contaminants migrating in surface soils and sediment, subsurface soils, groundwater, and surface water. Chemicals of concern were aldrin, arsenic, barium, carbon tetrachloride, chlordane, chromium, dieldrin, 1,2-dichloroethane, lead, nickel and trichloroethene. Seven of the eleven chemicals are classified as possible, probable or known human carcinogens. The cancer potency factors are used to calculate excess cancer risks associated with the site based on site contaminant concentrations. As defined in the NCP, the EPA considers individual excess cancer risks in the range of 1 in 10,000 ( $10^{-4}$ ) to 1 in 1,000,000 ( $10^{-6}$ ) as protective of human health with the 1 in 1,000,000 risk level as the point of departure. When a risk is in the  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  range, EPA makes a site specific determination as to whether the risk is unacceptable. The EPA implements response actions at all sites with an excess cancer risk greater than  $1 \times 10^{-4}$ . The results of the baseline risk assessment show that no offsite unacceptable health risks (a cancer risk greater than 1 in 10,000 or a Hazard Index greater than 1.0) are present with “typical” conditions; however, the onsite “worst” case cancer risk exceeds the 1 in 1,000,000 point of departure standard and exceeds the Hazard Index 1.0 standard.

The environmental risk assessment identified that the site is within the native range of three federally endangered species, the bald eagle, the Indiana bat, and the interior least tern; however, because the site does not contain the preferred habitat of these species, it is unlikely that exposure of site contaminants to these species will occur. No adverse impacts were identified for the local flora and fauna ecosystems.

The EPA bases its remedial action decisions on the Reasonable Maximum Exposures (RME) calculated for a particular site. For the Wheeling risk assessment, the EPA has determined that the risks presented as the typical case scenarios are the RME risks.

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The principal threat associated with the site was the waste disposed in the closed disposal units. Risk assessment indicated that exposures due to the principal threat and related secondary threats were either within the acceptable risk range or a low probability of occurrence. As a result, remedial actions at the site were based on the typical case risks. Worst case risks and future risks have been used to identify monitoring requirements.

In 1990 the PRPs completed site studies. The groundwater was found not to be of sufficient yield to allow for pumping for use, or to allow pumping and treating to be considered as a remedy. The FS evaluated alternative remedial actions to remove, treat or contain any hazardous substances, pollutants, or contaminants at the site.

## **IV. Remedial Actions**

### **Remedy Selection**

The ROD for the selection of the remedy was written and signed on September 27, 1990. The remedy recommended was the upgrading of the existing cover over the disposal area to comply with state and federal standards, long-term monitoring of groundwater and surface water, implementing site maintenance activities, installing security measures (warning signs and/or fences), and closing certain on-site wells.

### **Remedy Implementation**

The remedial design (RD) notice to proceed occurred on September 11, 1991. A Consent Decree for the PRP to conduct the RD and remedial action was signed in 1991 and entered by the court on October 1, 1992. The Pre-Final Design was submitted by the PRPs on July 23, 1993 and the PRP RD was complete on September 30, 1993. The award of the remedial action contract was on January 5, 1994. Remedial action activities were performed according to the approved Final RD Report and included the following.

1. Construction of four separate caps over the former industrial disposal areas. The caps involved four layers including (from bottom to top) a base compacted clay, a low density polyethylene synthetic liner, a synthetic drainage layer, and a vegetated two-foot soil layer. A perimeter trench and associated letdown channels were installed around each of the caps to control drainage flows.

2. Ten new groundwater monitoring wells were constructed on the site and will be used in conjunction with six existing wells to monitor the effectiveness of the remedy. The new wells were installed in clusters at various depths to address the loess/till interface seepage, and the shallow and deep groundwater in the lower aquifer. The groundwater monitoring program is included in the Operation and Maintenance (O&M) Plan which was approved as part of the Final RD Report.

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3. The site was completely regraded to promote drainage and minimize erosion. Inspection and maintenance activities were defined in the approved O&M Plan.

4. A deed restriction (covenant) prohibiting groundwater use for the entire site and farming on the capped areas was executed with the appropriate County Recorder's office. The Consent Decree imposes restrictions upon the use and occupancy of the property which constitute covenants running with the land binding on the owner and its successors.

5. A three-strand barbed-wire fence completely encloses the industrial disposal area including the new cap areas. Warning signs are posted frequently along the fence.

6. Eleven historic groundwater monitoring wells were closed according to MDNR



regulations.

In compliance with the Consent Decree, the responsible party remedial action was completed in 1994.

A pre-final inspection was conducted by the EPA, MDNR, and representatives of the PRPs on July 22, 1994. Several construction items were identified as incomplete and documented in a “punch” list at the end of the inspection. During the final inspection on July 27, 1994, EPA identified that all outstanding punch list items were completed and that all components of the selected remedy have been properly installed and constructed in accordance with the Final RD Report.

### **System Operation/Operation and Maintenance (O&M)**

The Settling Defendants are responsible for conducting the O&M activities for the site which include the groundwater and surface water monitoring, and site inspections, pursuant to the Consent Decree and the Final RD Report. Under the Consent Decree, groundwater and surface water samples are currently required to be collected annually. The monitoring includes analysis for VOCs, metals, and the pesticides, atrazine, dinoseb, and ethylene dibromide. Long-term maintenance includes semi-annual inspection and maintenance of the landfill cap, surface terraces, berms, riprap channel, and vegetative cover.

The first five-year review report was completed in September, 1999. The site was determined to be protective of human health and the environment based on the site maintenance and the groundwater and surface water data collected by PRPs in accordance with the Consent Decree.

Annual O& M costs for the site including landfill mowing and tree control, removal of investigation derived waste, and well pad repairs conducted over the past five years have averaged approximately \$2,000. Annual groundwater monitoring costs and project management, including report writing, site inspections and laboratory costs have averaged about \$30,000.

### **V. Progress Since the Last Five-Year Review**

The EPA prepared a Final Deletion Notice for the Wheeling site in order to remove the site from the NPL. The Final Deletion Notice appeared in the Federal Register on October 30, 2000. The Final Deletion Notice issued by the EPA included the requirement for the five-year review at this site because waste on site precludes unlimited use and unrestricted exposure.

When the site inspection was conducted by the PRP contractor for the second half of 2001, the well pads for monitoring wells MW-25S, MW-28D and MW-31D were identified as in need of replacement due to heaving and significant cracking of the concrete. These concrete pads were replaced in August, 2002.

An October 2002 letter was submitted by the PRP to MDNR to request a change to the

investigation derived waste (IDW) management plan for the site. MDNR provided approval of the proposed change in the IDW management plan in November 2002. Off-site disposal of IDW consisting of purge water generated during previous groundwater sampling events was completed in June 2003.

The PRPs have continued to maintain the site, including the semi-annual inspections and the annual groundwater and surface water monitoring. The semi-annual inspections for the ninth year were conducted on June 25, 2003 and November 6, 2003 in accordance with the O & M Plan. During the inspections of the cover integrity the caps and slopes were intact with no major cracks and no indication of erosion noted. A heavy growth of grass was present during the five year review inspection in June 2003. The annual mowing and cutting of trees was completed in August 2003. The annual groundwater and surface water monitoring was conducted on June 25, 26 and 27, 2003.

The industrial land use remains unchanged. There are no current or planned changes in land use.

## **VI. Five-Year Review Process**

### **Administrative Components/Community Involvement**

The Wheeling site second five-year review has included the following team members: Catherine Barrett, EPA Remedial Project Manager; Pia Capell, MDNR Project Manager, Tim Stecher and Bill Shefchik, PRP contractor representatives from Burns and McDonnell Consultants, and the EPA Community Involvement Coordinator.

This five-year review consisted of the following activities: (1) a review of relevant documents (Attachment 1); (2) discussions among representatives of the EPA, the MDNR, and the PRP contractor representatives; and, (3) a site inspection on June 25, 2003, which was attended by Catherine Barrett, EPA, Pia Capell, MDNR, and Tim Stecher and Bill Shefchik, the

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PRP contractor representatives from Burns and McDonnell Consultants.

A notice regarding the initiation of the five-year review is placed in a local newspaper and at the end of the review, a newspaper notice is placed indicating the availability of the five-year review report for the public. The five-year review report is available in the site information repository, the Rolling Hills Library, 514 W. Main Street, Savannah, Missouri 64458, in the EPA Superfund Division Records Center, 901 North 5<sup>th</sup> Street, Kansas City, Kansas 66101, and in the MDNR offices in Jefferson City, Missouri.

### **Document Review**

Section 121 (d) of CERCLA, as amended by SARA, requires that remedial actions comply with applicable, or relevant and appropriate, requirements or standards (ARARs) under federal or state environmental statutes or regulations. Several action-specific ARARs and

chemical-specific ARARs have been considered in the ROD for this site.

The action-specific ARARs are landfill closure and post-closure requirements defined in (1) Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C., Section 6901 et. seq., and in (2) Missouri Solid Waste Management (MSWM) Law of 1988, Sections 260.200 to 260.245, Supplement 1973, and MSWM Regulations, 10 CSR 80, effective December 29, 1988.

The chemical-specific ARARs are (1) Federal Maximum Contaminant Levels (MCLs) for inorganics and organics in drinking water supplies, 40 CFR Part 141, as defined in the Safe Drinking Water Act (SDWA) of 1974, as amended in 1986, 42 U.S.C., Section 300f et. seq., (2) the Federal Ambient Water Quality Standards as defined by the Clean Water Act (CWA) of 1977, as amended by the Water Quality Act (WQA) of 1987, 33 U.S.C., Section 1251 et. seq., and (3) state of Missouri water quality standards for inorganics and organics in ground water and surface water, 10 CSR 20-7.031.

## **Data Review**

Long-term monitoring of groundwater and surface water was one of the major components of the remedial action required in the ROD. Monitoring results indicate that contamination within the landfill above the MCL has not migrated off site. The monitoring activities are part of the site maintenance activities defined in the Consent Decree, October 1992, and in the O&M Plan, September 1993.

In the Consent Decree, the frequency of monitoring activities was reduced from quarterly to semiannually in the third year, and from semiannually to annually in the sixth year. The most recent sampling was the ninth year annual sampling for the groundwater and surface water monitoring.

In September 1998, a revised monitoring program was developed to evaluate the potential for off site migration. This revised monitoring program was approved by EPA on September 14, 1998. A modification to the monitoring program for the Spring 1999 sampling event was approved on May 7, 1999, and included removing the Routine Analytical Service (RAS) Pesticides from the full list of parameters. Throughout the monitoring program, RAS pesticides have not been detected above performance standards. The list of Special Analytical Service (SAS) Pesticides has also been modified to analyze for only atrazine, dinoseb, and ethylene dibromide (EDB). Throughout the monitoring program, the analytical results for pesticides have shown only atrazine, dinoseb, and EDB to have been detected in groundwater and/or surface water at levels above the performance standard. The current annual monitoring program was approved by EPA on July 6, 2000.

Beginning with the sixth year of sampling, samples were required under the Consent Decree to be collected once a year from six compliance points (five monitoring wells and one

surface water sample location) and from two monitoring points (two surface water seepage locations).

The annual groundwater monitoring and surface water monitoring have been conducted by the PRP in accordance with the Consent Decree. The sampling was conducted by the PRP contractor, Burns and McDonnell Consultants, for the ninth annual monitoring during June 25, 26 and 27, 2003. The data collected by the PRP contractor, were received by EPA and MDNR in October 2003 and are attached to this report as Attachment 2.

Analytical results for the June 2003 sampling have shown concentrations similar to past years. The higher concentrations of organics, including VOCs and pesticides, are in sample location MW-35I (TCE, vinyl chloride), SW-40 (TCE) and MW-35D (vinyl chloride) near the center of the landfill property. Inorganic parameters sampled included metals, total dissolved solids (TDS) and total suspended solids (TSS). Iron (Fe), manganese (Mn) and nickel (Ni) were higher at monitoring wells, MW-35D (Fe, Mn, and Ni) and MW-35I (Mn). Aluminum (Al) and Fe were highest at surface water locations SW-35 and SW-40. Chromium (Cr) and lead (Pb) were highest at SW-40.

Surface water sampling location SW-43 (onsite near the southeast property line) indicated a minor detection of TCE, below performance standards, which was similar to results in 2002. Groundwater sample MW-37D, screened below the flowing ravine onsite near the southeast property line, continued to show no detections of TCE.

Surface water location SW-40 indicated elevated concentrations in relation to previous sampling events. This is potentially due to increased silt content within the sample, as indicated by elevated total suspended and dissolved solids results. In addition, an increased silt content within the sample was observed during sampling.

Surface water location SW-35 indicated no detections of VOC constituents. Minor detections of TCE and 1,2-dichloroethene were identified at surface water location SW-35 during

the 2002 sampling event.

### **Site Inspection**

Representatives of EPA, MDNR and the PRP contractor, Burns and McDonnell Consultants, were present at the five-year review site inspection on June 25, 2003 conducted at the time of the annual groundwater and surface water monitoring by Burns and McDonnell Consultants. Those in attendance at the site inspection were Catherine Barrett, EPA Project Manager, Pia Capell, MDNR Project Manager, and Tim Stecher and Bill Shefchik, PRP contractor representatives from Burns and McDonnell Consultants. The purpose of the inspection was to assess the protectiveness of the remedy.

The five year inspection of the site included an examination of the cover integrity, drainage channels, groundwater monitoring wells, fences and signs, and the surface water data

collection areas, including the geologic lenses outcropping along the steep slopes of the stream banks. The grass and vegetation cover was very dense at the time of the June 25, 2003 inspection. The mowing of the cap was scheduled later in the summer, 2003. The surface terraces, berms, and riprap channel were maintained with no erosion problems apparent. The groundwater monitoring wells inspected were in good condition. Signs were posted and the perimeter fence was intact. No significant issues have been identified during the inspection or during the five-year review regarding the site conditions.

The PRP contractor, Burns and McDonnell Consultants submitted their inspection report covering the inspection of June 25, 2003 for the first half of the ninth year. The annual mowing and tree cutting on the site was completed in August 2003. An additional site inspection for the ninth year was conducted on November 6, 2003 covering the second half of the year in accordance with the Consent Decree. The inspection report submitted by the PRP contractor indicated that the cap and slopes were without any evidence of erosion and with slight vegetative growth after the August 2003 mowing of the grass cover. The report indicated that the gas venting system and groundwater monitoring wells were in good condition, with some wells to be labeled again during the next annual groundwater sampling, and the signs and fence surrounding the property were intact. The inspection reports provided by the PRP contractor for the June 2003 and November 2003 inspections are attached to this report (Attachment 3).

## **VII. Technical Assessment**

### **Question A: Is the remedy functioning as intended by the decision documents?**

- Implementation of Institutional Controls and Other Measures - The Wheeling Disposal Trust continues to be responsible for the site, and there are no current or planned changes in land use at the site.

- Remedial Action Performance - The remedy has been shown to be effective. The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy of upgrading the existing landfill which was selected in the ROD was appropriate.

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### **Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?**

- Changes in Standards and To Be Considereds - No new standards have been introduced which would be more stringent or which would affect protectiveness at the site.

- Changes in Exposure Pathways - No changes in the site conditions that affect exposure pathways were identified as part of this five-year review. There are no current or planned changes in land use. No new contaminants, sources, or routes of exposure were identified as part of this five-year review. There is no indication that hydrologic or geologic conditions are not adequately characterized. The contaminant levels in groundwater are consistent with expectations at the time of the ROD.

- Changes in Toxicity and Other Contaminant Characteristics - Toxicity and other factors for contaminants of concern have not changed.

- Changes in Risk Assessment Methodologies - There are no changes in risk assessment methodologies since the time of the ROD approval.

- Remedial Action Objectives used at the time of the remedy selection are still valid.

**Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

- No information has been identified that would call into question the protectiveness of the remedy.

**Technical Assessment Summary**

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. According to the documents reviewed, the data collected and the site inspection, the remedy selected by the ROD continues to be appropriate and protective. Contamination in the landfill has not moved offsite. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

**VIII. Issues**

There were no issues or deficiencies observed during this five-year review.

**IX. Recommendations and Follow-up Actions**

No deficiencies were observed during this five-year review, and no follow-up actions are necessary at this time.

**X. Protectiveness Statement**

The results of the five-year review indicate that the remedy is protective of human health and the environment. The remedy of upgrading the existing landfill and monitoring of groundwater and surface water, has been shown to be effective. The site has not been shown to cause any significant adverse impact on the environment.

**XI. Next Review**

This is a statutory five-year review. The first five-year review was conducted in 1999. The next five-year review for this Superfund site will be conducted in the year 2009.

## **ATTACHMENTS**

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### **ATTACHMENT 1**

#### **List of Documents Reviewed**

“Remedial Investigation Report, Wheeling Disposal Company Landfill Site, Amazonia, Missouri”, prepared by the PRPs, 1990.

“Feasibility Study, Wheeling Disposal Company Landfill Site, Amazonia, Missouri”, prepared by the PRPs, 1990.

“Record of Decision, Wheeling Disposal Service Company Landfill, Amazonia, Missouri”, prepared by the Environmental Protection Agency, September, 1990.



“Consent Decree, Civil Action No. 92-0132-CV-W-1, Wheeling Disposal Company Landfill Site, Amazonia, Missouri”, entered by the court on October 1, 1992.

“Five-Year Review Report for the Wheeling Disposal Service Company, Incorporated, Landfill Site, Amazonia, Missouri”, prepared by the Environmental Protection Agency, September 29, 1999.

“Superfund Site Final Close Out Report, Wheeling Disposal Service Landfill Site, Amazonia, Missouri”, prepared by the Environmental Protection Agency, August 18, 2000.

“Direct Final Notice of Deletion of the Wheeling Disposal Company, Incorporated, Landfill Site from the National Priorities List”, prepared by the Environmental Protection Agency, in the Federal Register October 30, 2000.

“Annual Monitoring Program Report, Ninth Year - June 2003, Wheeling Disposal Site, Amazonia, Missouri.”, prepared by Burns and McDonnell Consultants, October, 2003.

**ATTACHMENT 2**

**Sampling Data**

**Received October, 2003**

**Table 7**  
**Organic Parameter Analytical Results in Groundwater**

Sample Point: Date Sampled: Laboratory Number:		MW-26I 06/27/2003 606202497	MW-26D 06/27/2003 606202489	MW-27S 06/27/2003 606202539	MW-28D 06/27/2003 606202554	MW-32S 06/27/2003 606202547	MW-35I 06/27/2003 606202521	MW-35D 06/27/2003 606202505	D-1 06/27/2003 606202513
<b>Volatiles</b>	<b>UNITS</b>								
1,1-Dichloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	44.7 J	10 U	10 U
1,2-Dichloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	27.5 J	10 U	10 U
Carbon Tetrachloride	ug/L	10 U	10 U	10 U	10 U	10 U	3500	10 U	10 U
Chloroform	ug/L	10 U	10 U	10 U	10 U	10 U	400	10 U	10 U
cis-1,2-Dichloroethene	ug/L	10 U	10 U	10 U	10 U	10 U	83.3 J	10 U	10 U
Methylene Chloride	ug/L	10 U	10 U	10 U	10 U	10 U	37.8 J	3.0 J	3.3 J
trans-1,2-Dichloroethene	ug/L	10 U	10 U	10 U	10 U	10 U	22.7 J	10 U	10 U
Trichloroethene	ug/L	10 U	10 U	10 U	10 U	10 U	5090	3.1 J	3.3 J
Trichlorofluoromethane	ug/L	10 U	10 U	10 U	10 U	10 U	726	10 U	10 U
Vinyl Chloride	ug/L	10 U	10 U	10 U	10 U	10 U	293	6.0 J	6.3 J
<b>Pesticides</b>									
Atrazine	ug/L	NA	NA	NA	NA	NA	0.43 U	0.79	0.64
Dinoseb	ug/L	NA	NA	NA	NA	NA	26.7	2 UJ*	3.9
1,2-Dibromoethane (EDB)	ug/L	NA	NA	NA	NA	NA	12	0.029 U	0.029 U

Footnote: Only detected parameters are shown.

LEGEND:    B- Detected in the associated laboratory method blank    F- Detected in the associated equipment rinsate blank    J- Qualified as estimated by the laboratory    J\*- Qualified as estimated in the QC evaluation  
               R- Qualified as unusable in the QC evaluation    T- Detected in associated trip blank    U- Qualified as undetected by the laboratory    U\*- Qualified as undetected in the QC evaluation

**Table 1**  
**Organic Parameter Analytical Results in Groundwater**

Sample Point:		MW-36I	MW-36D	MW-37D
Date Sampled:		06/25/2003	06/25/2003	06/26/2003
Laboratory Number:		606195394	606195402	606200384
<b>Volatiles</b>	<b>UNITS</b>			
1,1-Dichloroethane	ug/L	10 U	10 U	10 U
1,2-Dichloroethane	ug/L	10 U	10 U	10 U
Carbon Tetrachloride	ug/L	10 U	10 U	10 U
Chloroform	ug/L	10 U	10 U	10 U
cis-1,2-Dichloroethene	ug/L	10 U	10 U	10 U
m,p-Xylene	ug/L	10 U	10 U	10 U
trans-1,2-Dichloroethene	ug/L	10 U	10 U	10 U
Trichloroethene	ug/L	10 U	10 U	10 U
Trichlorofluoromethane	ug/L	10 U	10 U	10 U
Vinyl Chloride	ug/L	10 U	10 U	10 U
<b>Pesticides</b>				
Altrazine	ug/L	NA	NA	NA
Dinoseb	ug/L	NA	NA	NA
1,2-Dibromoethane (EDB)	ug/L	NA	NA	NA

Footnote: Only detected parameters are shown.

LEGEND: B- Detected in the associated laboratory method blank

R- Qualified as unusable in the QC evaluation

NA- Not analyzed

F- Detected in the associated equipment rinsate blank

T- Detected in associated trip blank

ND- Not Detected

J- Qualified as estimated by the laboratory

U- Qualified as undetected by the laboratory

Bold - Result exceeded screening value.

J\*- Qualified as estimated in the QC evaluation

U\*- Qualified as undetected in the QC evaluation

**Table 8**  
**Organic Parameter Analytical Results for Surface Water**

Sample Point: Date Sampled: Laboratory Number:		SW-35 06/26/2003 606200301	D-2 06/26/2003 606200335	SW-40 06/26/2003 606200343	SW-41 06/26/2003 606200392	SW-42 06/26/2003 606200368	SW-43 06/26/2003 606200376
Volatiles	UNITS						
Carbon Tetrachloride	ug/L	10 U	10 U	4.0 J	10 U	10 U	10 U
Chloroform	ug/L	10 U	10 U	2.4 J	10 U	10 U	10 U
Trichloroethene	ug/L	10 U	10 U	24.6	10 U	10 U	1.3 J
Trichlorofluoromethane	ug/L	10 U	10 U	3.1 J	10 U	10 U	10 U
Pesticides							
Atrazine	ug/L	0.40 U	0.41	0.40 U	NA	NA	NA

Footnote: Only detected parameters are shown.

LEGEND: B- Detected in the associated laboratory method blank F- Detected in the associated equipment rinsate blank J- Qualified as estimated by the laboratory J'- Qualified as estimated in the QC evaluation  
R- Qualified as unusable in the QC evaluation T- Detected in associated trip blank U- Qualified as undetected by the laboratory U'- Qualified as undetected in the QC evaluation  
NA- Not Analyzed NA'- Not Analyzed NA'- Not Analyzed

**Table 9**  
**Inorganic Parameter Analytical Results for Groundwater**

Sample Point:		MW-26I	MW-26D	MW-27S	MW-28D	MW-32S	MW-35I	MW-35D	D-1
Date Sampled:		06/27/2003	06/27/2003	06/27/2003	06/27/2003	06/27/2003	06/27/2003	06/27/2003	06/27/2003
Laboratory Number:		606202497	606202489	606202539	606202554	606202547	606202521	606202505	606202513
<b>Metals, Total</b>	UNITS								
Barium, Total	ug/L	NA	NA	NA	NA	NA	200 U	517	521
Calcium, Total	ug/L	NA	NA	NA	NA	NA	322,000 J*	214,000 J*	211,000 J*
Cobalt, Total	ug/L	NA	NA	NA	NA	NA	50 U	132	133
Iron, Total	ug/L	NA	NA	NA	NA	NA	100 U	1,750 J*	1,760 J*
Magnesium, Total	ug/L	NA	NA	NA	NA	NA	130,000 J*	60,900 J*	61,200 J*
Manganese, Total	ug/L	NA	NA	NA	NA	NA	58.1 J*	441 J*	443 J*
Nickel, Total	ug/L	NA	NA	NA	NA	NA	40 U	855 J*	862 J*
Potassium, Total	ug/L	NA	NA	NA	NA	NA	5,440	5,000 U	5,000 U
Sodium, Total	ug/L	NA	NA	NA	NA	NA	39,500 J*	114,000 J*	113,000 J*
<b>Water Quality Parameters</b>									
Total Dissolved Solids	mg/L	422	427	2540	329	2080	2220	1590	1610
Total Suspended Solids	mg/L	5 U	31	41	72	5	5 U	5 U	5 U

Footnote: Only detected parameters are shown.

LEGEND:	B- Detected in the associated laboratory method blank	F- Detected in the associated equipment rinseate blank	J- Qualified as estimated by the laboratory	J*- Qualified as estimated in the QC evaluation
	R- Qualified as unusable in the QC evaluation	T- Detected in associated trip blank	U- Qualified as undetected by the laboratory	U*- Qualified as undetected in the QC evaluation
	NA- Not analyzed	ND- Not Detected	Bold - Result exceeded screening value.	

**Table 3**  
**Inorganic Parameter Analytical Results for Groundwater**

Sample Point:		MW-36I	MW-36D	MW-37D
Date Sampled:		06/25/2003	06/25/2003	06/26/2003
Laboratory Number:		606195394	606195402	606200384
<b>Metals, Total</b>	<b>UNITS</b>			
Barium, Total	ug/L	NA	NA	NA
Calcium, Total	ug/L	NA	NA	NA
Cobalt, Total	ug/L	NA	NA	NA
Iron, Total	ug/L	NA	NA	NA
Magnesium, Total	ug/L	NA	NA	NA
Manganese, Total	ug/L	NA	NA	NA
Nickel, Total	ug/L	NA	NA	NA
Potassium, Total	ug/L	NA	NA	NA
Sodium, Total	ug/L	NA	NA	NA
<b>Water Quality Parameters</b>				
Total Dissolved Solids	mg/L	<b>1380</b>	<b>368</b>	<b>897</b>
Total Suspended Solids	mg/L	5 U	5 U	26

Note: Only detected parameters are shown.

ND: B- Detected in the associated laboratory method blank	F- Detected in the associated equipment rinsate blank	J- Qualified as estimated by the laboratory	J*- Qualified as estimated in the QC evaluation
R- Qualified as unusable in the QC evaluation	T- Detected in associated trip blank	U- Qualified as undetected by the laboratory	U*- Qualified as undetected in the QC evaluation
NA- Not analyzed	ND- Not Detected	Bold - Result exceeded screening value.	

**Table 10**  
**Inorganic Parameter Analytical Results for Surface Water**

Sample Point: Date Sampled: Laboratory Number:		SW-35 06/26/2003 606200301	D-2 06/26/2003 606200335	SW-40 06/26/2003 606200343	SW-41 06/26/2003 606200392	SW-42 06/26/2003 606200368	SW-43 06/26/2003 606200376
Metals, Total	UNITS						
Aluminum, Total	ug/L	3,700 J*	3,520 J*	26,600 J*	NA	NA	NA
Arsenic, Total	ug/L	10 U	10 U	16.9	NA	NA	NA
Barium, Total	ug/L	204	204	493	NA	NA	NA
Cadmium, Total	ug/L	5 U	5 U	5.5	NA	NA	NA
Calcium, Total	ug/L	81,700 J*	82,000 J*	397,000 J*	NA	NA	NA
Chromium, Total	ug/L	10 U	10 U	30.1	NA	NA	NA
Copper, Total	ug/L	25 U	25 U	38.1	NA	NA	NA
Iron, Total	ug/L	5,080 J*	4,450 J*	37,400 J*	NA	NA	NA
Lead, Total	ug/L	4.4 J*	3 U	26.4	NA	NA	NA
Magnesium, Total	ug/L	14,900 J*	15,300 J*	124,000 J*	NA	NA	NA
Manganese, Total	ug/L	214 J*	171 J*	2,170 J*	NA	NA	NA
Nickel, Total	ug/L	40 UJ*	40 UJ*	55.3 J*	NA	NA	NA
Potassium, Total	ug/L	6,530	6,500	7,450	NA	NA	NA
Sodium, Total	ug/L	9,150 J*	9,130 J*	48,500 J*	NA	NA	NA
Vanadium, Total	ug/L	50 U	50 U	69.8	NA	NA	NA
Zinc, Total	ug/L	20 U	20 U	110	NA	NA	NA
<b>Metals, Dissolved</b>							
Calcium, Dissolved	ug/L	75,400 J*	74,300 J*	355,000 J*	NA	NA	NA
Magnesium, Dissolved	ug/L	13,200	13,000	108,000	NA	NA	NA
Manganese, Dissolved	ug/L	55.1	133	699	NA	NA	NA
Potassium, Dissolved	ug/L	5,390	5,360	5000 U	NA	NA	NA
Sodium, Dissolved	ug/L	8,710	8,390	45,000	NA	NA	NA
<b>Water Quality Parameters</b>							
Total Dissolved Solids	mg/L	402	397	3930	590	195	366
Total Suspended Solids	mg/L	358	97	360	5 U	24	8

Footnote: Only detected parameters are shown.

LEGEND: B- Detected in the associated laboratory method blank F- Detected in the associated equi J- Qualified as estimated by the laboratory J\*- Qualified as estimated in the QC evaluation  
R- Qualified as unusable in the QC evaluation T- Detected in associated trip bla U- Qualified as undetected by the laboratory U\*- Qualified as undetected in the QC evaluation  
NA- Not analyzed ND- Not Detected Bold - Result exceeded screening value.



**ATTACHMENT 3**

**Inspection Reports**

**June, 2003 and November, 2003**

**Five Year Review Inspection Photos**

**WHEELING DISPOSAL SITE  
AMAZONIA MISSOURI  
INSPECTION CHECKLIST  
32959**

Inspection Number: 19

First Half Ninth Year Monitoring

Date: June 25, 2003

Inspectors Name: Tim Stecher

<b>Cover Integrity</b>	
Surface Cracks	No major cracks, all four cap locations.
<b>Erosion</b>	<b>All caps and slopes intact. No potential erosion problems identified.</b>
Condition of Vegetation	Moderate to heavy growth and in good condition. Vegetated grass cover last mowed in July 2002. Limited reoccurring tree growth on north slope. Mowing and tree cutting scheduled for August 2003.
<b>Drainage Channels</b>	
Terrace	Excellent slope.
Let-Down	Riprap in good condition. Limited vegetation growth within letdown channel. Erosion repairs completed in Fall 2001 in good condition.
<b>Perimeter</b>	<b>Good condition, signs in place.</b>
Gas Venting System	Good condition, none broken.
<b>Groundwater Monitoring Wells</b>	<b>Good condition, pads intact, wells locked, with the exception of three wells. Well pads for Monitoring wells MW-25S, MW-28D, and MW-31D repaired in 2002.</b>
Fencing	Good condition, gates are locked and functional.
<b>Warning Signs</b>	<b>Intact and in good condition.</b>
Benchmarks	Good condition.
<b>Cover Side Slopes (&gt;5%)</b>	<b>Good condition. Moderate to highly vegetated.</b>















## Five Year Review Site Inspection Photos





